

WHAT IS CLAIMED IS:

1. A system, comprising:
 - 5 a node including an active device, an interface to an inter-node network, a memory, and an address network coupling the active device, the interface, and the memory;
 - an additional node coupled to the node by the inter-node network;
 - 10 wherein in response to receiving from the active device an address packet initiating a transaction to gain an access right to a coherency unit, the memory is configured to send a report corresponding to the address packet to the interface if the transaction cannot be satisfied within the node;
 - 15 wherein the interface is configured to ignore the address packet and to send a coherency message requesting the access right to the additional node via the inter-node network in response to the report.
- 20 2. The system of claim 1, wherein the node includes a data network coupling the active device, the interface, and the memory, and wherein the memory is configured to send the report to the interface in a data packet.
- 25 3. The system of claim 1, wherein the address packet is a read-to-own packet, the access right is a write access right, and wherein the memory is configured to send the report corresponding to the read-to-own packet to the interface if a global access state of the coherency unit in the node is any global access state other than a modified global access state.

4. The system of claim 3, wherein the node includes an additional active device, wherein the additional active device is configured to transition a read access right to the coherency unit to an invalid access right upon receipt of the read-to-own packet.

5 5. The system of claim 3, wherein the address network is configured to convey the read-to-own packet in broadcast mode, wherein the active device is configured to gain an ownership responsibility for the coherency unit upon receipt of the read-to-own packet.

6. The system of claim 5, wherein an additional interface included in the additional
10 node is configured to receive the coherency message on the inter-node network, wherein the additional interface is configured to send a proxy address packet on an address network included in the additional node in response to the coherency message.

7. The system of claim 3, wherein in response to sending the coherency message, the
15 interface is configured to receive an additional coherency message on the inter-node network;

wherein in response to the additional coherency message, the interface is
configured to send data corresponding to the coherency unit to the active
20 device.

8. The system of claim 7, wherein the active device is configured to gain the write access right to the coherency unit upon receipt of the data.

9. The system of claim 7, wherein the interface is further configured to send data
25 corresponding to the coherency unit to the memory in response to the additional coherency message, wherein in response to the data, the memory is configured to update the global access state of the coherency unit in the node to the modified global access state.

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10. The system of claim 3, wherein the memory is configured to send data corresponding to the coherency unit to the active device if the global access state is the modified state and if the memory has an ownership responsibility for the coherency unit, wherein the active device is configured to gain the write access right upon receipt of the data.

11. The system of claim 1, wherein the address packet is a read-to-share packet, the access right is a read access right, and wherein the memory is configured to send the report corresponding to the read-to-share packet to the interface if a global access state of the coherency unit in the node is not a modified global access state or a shared global access state.

12. The system of claim 1, wherein the interface is configured to add a record corresponding to the report to an outstanding transaction queue in response to receiving the report;

wherein the interface is configured to add a record to the outstanding transaction queue in response to each address packet specifying a coherency unit that is not mapped by the memory.

13. The system of claim 12, wherein the interface is configured to send a corresponding coherency message on the inter-node network in response to each record in the outstanding transaction queue.

14. A node for use in a multi-node system, the node comprising:

a plurality of devices including a memory, an active device, and an interface configured to send and receive coherency messages on an inter-node network coupling nodes in the multi-node computer system;

an address network configured to convey packets between the plurality of devices;

wherein in response to receiving from the active device an address packet
initiating a transaction to gain an access right to a coherency unit, the
5 memory is configured to send a report corresponding to the address packet
to the interface if the transaction cannot be satisfied within the node;

wherein the interface is configured to ignore the address packet and to send a
coherency message requesting the access right on the inter-node network
10 in response to the report.

15. The node of claim 14, wherein the node includes a data network coupling the
active device, the interface, and the memory, and wherein the memory is configured to
send the report to the interface in a data packet.

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16. The node of claim 14, wherein the address packet is a read-to-own packet, the
access right is a write access right, and wherein the memory is configured to send the
report corresponding to the read-to-own packet to the interface if a global access state of
the coherency unit in the node is any global access state other than a modified global
20 access state.

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17. The node of claim 16, wherein the node includes an additional active device,
wherein the additional active device is configured to transition a read access right to the
coherency unit to an invalid access right upon receipt of the read-to-own packet.

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18. The node of claim 16, wherein the address network is configured to convey the
read-to-own packet in broadcast mode, wherein the active device is configured to gain an
ownership responsibility for the coherency unit upon receipt of the read-to-own packet.

19. The node of claim 16, wherein in response to sending the coherency message, the interface is configured to receive an additional coherency message on the inter-node network;

5 wherein in response to the additional coherency message, the interface is configured to send data corresponding to the coherency unit to the active device.

20. The node of claim 19, wherein the active device is configured to gain the write
10 access right to the coherency unit upon receipt of the data.

21. The node of claim 19, wherein the interface is further configured to send data corresponding to the coherency unit to the memory in response to the additional coherency message, wherein in response to the data, the memory is configured to update
15 the global access state of the coherency unit in the node to the modified global access state.

22. The node of claim 16, wherein the memory is configured to send data corresponding to the coherency unit to the active device if the global access state is the modified state and if the memory has an ownership responsibility for the coherency unit,
20 wherein the active device is configured to gain the write access right upon receipt of the data.

23. The node of claim 14, wherein the address packet is a read-to-share packet, the
25 access right is a read access right, and wherein the memory is configured to send the report corresponding to the read-to-share packet to the interface if a global access state of the coherency unit in the node is not a modified global access state or a shared global access state.

24. The node of claim 14, wherein the interface is configured to add a record corresponding to the report to an outstanding transaction queue in response to receiving the report;

5 wherein the interface is configured to add a record to the outstanding transaction queue in response to each address packet specifying a coherency unit that is not mapped by the memory.

25. The node of claim 24, wherein the interface is configured to send a corresponding
10 coherency message on the inter-node network in response to each record in the outstanding transaction queue.

26. A method of operating a multi-node system, wherein the multi-node system includes a node and an additional node coupled by an inter-node network, the method
15 comprising:

an active device in the node initiating a transaction to gain an access right to a coherency unit by sending an address packet on an address network within the node;

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an interface in the node ignoring the address packet;

in response to said sending the address packet, a memory in the node sending a report corresponding to the address packet to the interface if the
25 transaction cannot be satisfied within the node; and

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in response to the report, the interface sending a coherency message to an additional interface in the additional node via the inter-node network, wherein the coherency message requests the access right to the coherency
30 unit.

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27. The method of claim 26, wherein the node includes a data network coupling the active device, the interface, and the memory, and wherein said sending the report comprises the memory sending a data packet containing the report to the interface via the data network.

28. The method of claim 26, wherein the address packet is a read-to-own packet, the access right is a write access right, and wherein the method further comprises the memory determining that the transaction cannot be satisfied within the node if a global access state of the coherency unit in the node is any global access state other than a modified global access state.

29. The method of claim 28, wherein the node includes an additional active device, wherein the method comprises the additional active device transitioning a read access right to the coherency unit to an invalid access right upon receipt of the read-to-own packet.

30. The method of claim 29, further comprising:
the address network conveying the read-to-own packet in broadcast mode; and
the active device gaining an ownership responsibility for the coherency unit upon receipt of the read-to-own packet.

31. The method of claim 30, further comprising:
an additional interface included in the additional node receiving the coherency message on the inter-node network; and

the additional interface sending a proxy address packet on an additional address network included in the additional node in response to the coherency message.

5 32. The method of claim 28, further comprising:

the interface receiving an additional coherency message on the inter-node network, wherein the additional coherency message is responsive to the coherency message;

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in response to the additional coherency message, the interface sending data corresponding to the coherency unit to the active device.

15 33. The method of claim 32, further comprising the active device gaining the write access right to the coherency unit upon receipt of the data.

34. The method of claim 32, further comprising:

20 the interface sending data corresponding to the coherency unit to the memory in response to the additional coherency message; and

in response to the data, the memory updating the global access state of the coherency unit in the node to the modified global access state.

25 35. The method of claim 28, further comprising:

the memory sending data corresponding to the coherency unit to the active device if the global access state is the modified state and if the memory has an ownership responsibility for the coherency unit; and

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the active device gaining the write access right upon receipt of the data.

36. The method of claim 26, wherein the address packet is a read-to-share packet, the access right is a read access right, and wherein said sending the report occurs if a global
5 access state of the coherency unit in the node is not a modified global access state or a shared global access state.

37. The system of claim 26, further comprising:
10 the interface adding a record corresponding to the report to an outstanding transaction queue in response to receiving the report; and
the interface adding a record to the outstanding transaction queue in response to each address packet specifying a coherency unit that is not
15 mapped by the memory.

38. The method of claim 37, further comprising the interface sending a corresponding coherency message on the inter-node network in response to each record in the outstanding transaction queue.
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